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CLAIMS:

1. A field-effect transistor, comprising:

a ferromagnetic layer, having a film thickness of 50 nm or less, which is made of a Ba-Mn oxide showing ferromagnetism at 0°C or higher;

a dielectric layer made of a dielectric material or a ferroelectric material, said ferromagnetic layer and said dielectric layer being bonded to each other.

2. The field-effect transistor as set forth in claim 1, wherein the ferromagnetic layer is made of a Ba-Mn oxide whose composition is represented by $(La_{1-x}Ba_x) MnO_3$ where x satisfies $0.05 < x < 0.3$.

3. The field-effect transistor as set forth in claim 1, wherein the ferromagnetic layer is made of a Ba-Mn oxide whose composition is represented by $(La_{1-x}Ba_x) MnO_3$ where x satisfies $0.10 < x < 0.3$.

4. The field-effect transistor as set forth in claim 1, 2, or 3, wherein the dielectric material or the ferroelectric material is $BaTiO_3$, $SrTiO_3$, $(Ba_{1-y}Sr_y) TiO_3$, $PbTiO_3$, $Pb (Zr_{1-z}Ti_z) TiO_3$, or Al_2O_3 , where y satisfies $0 < y < 1$ and z satisfies $0 < z < 1$.

5. The field-effect transistor as set forth in claim 1, 2, or 3, wherein the dielectric material or the ferroelectric material is $BaTiO_3$, $SrTiO_3$, $(Ba_{1-y}Sr_y) TiO_3$, $PbTiO_3$, or Al_2O_3 , where y satisfies $0 < y < 1$.

6. The field-effect transistor as set forth in any one of claims 1 to 5, having a bottom-gate structure.